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AUG 31 1939
U. S. DEPT. OF AGRICULTURE

For Radio Broadcast in Connection With Air Progress for 1939
Sponsored by National Aeronautic Association

Prepared in Aerological Division
United States Weather Bureau
Washington, D. C.

THE WEATHER BUREAU'S ROLE IN AIR PROGRESS

It is quite natural that meteorology, the science of the earth's atmosphere, should play an important part in aiding the progress which we are making in air travel. The atmosphere through which we fly is the realm where storms develop to hinder us or where upper-air winds are blowing which might aid our flight. It is necessary to know the weather if we would avoid the hazards and take full advantage of the benefits which are present in the atmosphere while we are flying.

By authority of the Air Commerce Act of 1926 and the Civil Aeronautics Act of 1938, the Weather Bureau is charged with the responsibility of furnishing the necessary information in order that air navigation may secure the protection and efficiency afforded by an adequate airway meteorological service.

Perhaps the first and most important thing a pilot wishes to know before attempting a flight is the present condition of the weather at the place of take-off, along the route, and at the destination of the flight. To provide this information, the Weather Bureau has developed a system which now includes 840 airport, off-airway, and intermediate airway weather reporting stations. Observations from these stations are transmitted rapidly to air terminals by the extensive radio and teletype communication network of the Civil Aeronautics Authority. The reports are received and posted on bulletin boards of Weather Bureau airport stations usually within a few minutes from the time of the observations. The reports are also broadcast to planes in the air. Pilots are thus informed of conditions of ceiling, which is the height of cloud base above the ground; sky conditions, that is - whether the sky is clear, there are scattered or broken clouds present, or it is overcast; visibility, rain, snow, fog, etc.;

temperature; dew point; wind direction and velocity, and barometric pressure.

Charts are prepared four times daily at all important airports, showing the direction and velocity of the wind at various flying levels. The reports which make possible the preparation of such a chart come from 101 stations where the path of an ascending balloon has been followed by means of a special telescope. A knowledge of the winds aloft enables the pilot to choose a flying level or route where the winds will give the most help or least resistance.

After the pilot is satisfied that present weather conditions appear suited to a safe flight, and he has determined his route and level to avoid hazards and take advantage of winds aloft, he is most concerned with the conditions expected while he will be in the air. These expected conditions are indicated in the Weather Bureau's airway forecasts.

If it were possible, the ideal way to make a forecast would be to ascend to some great height and view the changing weather over the earth's surface. Since this is not possible, the meteorologist prepares charts and maps which are based on simultaneous reports from hundreds of well distributed stations. Weather maps are prepared at approximately 125 Weather Bureau Airport Stations, but only thirteen of these issue forecasts which altogether cover the thousands of miles of civil airways in the United States. In cooperation with other countries, this forecast service now also covers the transatlantic air routes.

Great advances have been made during the last few years in developing new methods of forecasting. Weather Bureau meteorologists are now given intensive training courses in interpretation of maps and charts according to the latest theories of air mass analysis. Qualification standards of forecasters are being steadily advanced.

In order to apply the theory of air mass analysis in forecasting, it is necessary that the forecasters be supplied not only with the conditions of weather as observed at the surface and the direction and velocity of the winds aloft, but also with other atmospheric conditions in the upper air.

This information concerning conditions aloft is now obtained for Weather Bureau meteorologists at 37 stations, including seven of the Navy and two of the Army. The observations are made once a day by means of the radiosonde, a lightweight instrument and radio transmitter which, when attached to an inflated rubber balloon and released, ascends in the air to heights of fifteen or more miles, broadcasting signals which depict the temperature, humidity, and pressure of the atmosphere through which it is rising. These signals are received at the ground station and transformed into a report which is relayed by teletype to the stations which use the results of radiosonde observations in preparing charts. These charts are useful in identifying air masses, tracing their movement, and defining their boundaries. They also indicate the likelihood of clouds, precipitation, icing, etc.

In addition to the charts of upper-air conditions, the forecaster prepares maps of conditions at the surface which are obtained from the reports previously described. All reports are then coordinated and used by the meteorologist to arrive at his conclusions regarding the weather which is expected.

Airway forecasts are made and transmitted over the teletype and broadcast to pilots in the air every six hours and cover a period of eight hours. They indicate expected ceiling heights, sky covering, visibility, precipitation, fog, icing and unusual winds for airways and air terminals, as well as movements of air masses and attendant frontal systems.

The Weather Bureau fully realizes its responsibility of supplying the necessary meteorological service for the protection of air navigation. It also realizes that aeronautics is destined to have phenomenal growth and is preparing by means of research and development of new technique, instruments and organization, to render the utmost service possible to this important industry.

The United States will continue its responsibility to support the
economic development of the world. It is the policy of the United States
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